PARAMAGNETIC METAL ION-BASED MACROCYLIC MAGNETIZATION TRANSFER CONTRAST AGENTS AND METHOD OF USE

ABSTRACT OF THE DISCLOSURE

The present invention is directed, in general, to contrast agents (CA), and methods and systems of using such agents for producing image contrast based on a magnetization transfer (MT) mechanism. The CA comprises a tetraazacyclododecane ligand having pendent arms R, R', R'' and R''' that are amides having a general formula: $-CR_1H-CO-NH-CH_2-R_2$. R_1 includes organic substituents and R_2 is not hydrogen. A paramagnetic metal ion (M) is coordinated to the ligand. The method, comprises subjecting a CA, in a sample, to a radio frequency pulse. The CA has pendent arms R, R', R'' and R''' comprising organic substituents and the ligand further includes a M and a water molecule. A signal is obtained by applying a radio frequency pulse at a resonance frequency of the water molecule. The magnetic resonance system, comprises a magnetic resonance apparatus and the CA, the agent containing a ligand having the above described general formula.